

POLYMERS FOR CONTROL OF ORIENTATION  
AND STABILITY OF LIQUID CRYSTALS

ABSTRACT OF THE DISCLOSURE

An electro-optically active polymer gel material comprising a high molecular weight alignment polymer adapted to be homogeneously dispersed throughout a liquid crystal to control the alignment of the liquid crystal molecules and/or confer mechanical stability is provided. The electro-optically active polymer gel comprises a homogenous gel in which the polymer strands of the gel are provided in low concentration and are well solvated by the small molecule liquid crystal without producing unacceptable slowing of its electrooptic response. During formation of the gel, a desired orientation is locked into the gel by physical or chemical cross-linking of the polymer chains. The electro-optically active polymer is then utilized to direct the orientation in the liquid crystal gel in the "field off" state of a liquid crystal display. The electro-optically active polymer also provides a memory of the mesostructural arrangement of the liquid crystal and acts to suppress the formation of large scale deviations, such as, for example, fan-type defects in a FLC when subjected to a mechanical shock. A method of making an electro-optically active polymer gel material and an electrooptic device utilizing the electro-optically active polymer gel of the present invention is also provided.